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Entry 1 of 1

File: USPT

Feb 8, 2000

DOCUMENT-IDENTIFIER: US 6022500 A

TITLE: Polymer encapsulation and polymer microsphere composites

## DEPR:

Enhanced band-gap semiconductor nanoparticles are also suitable for polymer encapsulation. Thiol groups bind irreversibly to nanoparticle CdS and CdSe and are often used to cap surface emissions. First CdS is nucleated in the micelles using well established and simple procedures (bubbling H<sub>2</sub>S through CdCl<sub>2</sub> containing micelles or mixing CdCl<sub>2</sub> micelles with Na<sub>2</sub>S micelles). Then hydroxythiophenol (FIG. 12) is used as the monomer for enzymatic polymerization. The monomer binds to CdS and the polymer formed carries the CdS or CdSe with it. Thus this method provides not just an encapsulation of the nanoparticles but a composite material with the CdS or CdSe covalently linked to the polymer. The attachment of CdS or CdSe to the polymer enhanced the red-shift in fluorescence emission. Nanoparticle CdSe for example, emits at a wavelength between 580-620 nm (excitation at 514 nm) depending on particle size.

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## Document Number 1

Entry 1 of 1

File: USPT

Mar 14, 2000

DOCUMENT-IDENTIFIER: US 6037124 A

TITLE: Carboxylated polyvinylidene fluoride solid supports for the immobilization of biomolecules and methods of use thereof

## DEPR:

A second method of the present invention is outlined in FIG. 2 wherein the various steps of the method are illustrated. Referring to FIG. 2, a carboxylated PVDF solid support (1) is first activated through its pendent carboxyl groups (5). In preferred embodiments, active esters are formed by reacting carboxyl groups with a suitable reagent such as carbodiimides (EDAC, DDC or the like), with or without NHS as a catalyst. Alternatively, the activated support can be converted to acid halides (0.dbd.C--X, where X=I, Br, Cl, F); other active esters (NHS, p-nitrophenyl, and the like); or transformed into acyl azides (0.dbd.C--N.sub.3) from the hydrazide (0.dbd.C--NH--NH.sub.2 R) which is also an active intermediate. The activation provides active sites (6) which promote the attachment of reactive nucleophilic groups found on derivatized oligonucleotides e.g., an oligonucleotide labeled at its 5' or 3' terminus with an amino functionality. (7). Following covalently coupling a derivatized oligonucleotide probe (7) to an activated support (5) to form covalently immobilized oligonucleotide probes, applying a sample containing labeled target oligonucleotides (8) under hybridizing conditions will result in the oligonucleotide probe and the oligonucleotide target forming a complex when they are sufficiently complementary. After thoroughly washing the carboxylated PVDF surface, detecting the presence of the label determines the presence of complementary oligonucleotide target in the sample. The label can be a streptavidin-conjugate label or other reporter system (9). Other labels and reporter groups are described above.

Streptavidin-conjugates include: alkaline phosphatase, horseradish peroxidase, FITC, Cy5, gold nanoparticles.

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Entry 4 of 5

File: USPT

Nov 3, 1998

DOCUMENT-IDENTIFIER: US 5830538 A

TITLE: Method to form a polycrystalline film on a substrate

**BSPR:**

The current invention involves coating a desired substrate with a subscribed amount of nanocrystals. The nanocrystals serve as nuclei for seeding the growth of a polycrystalline film. Said film grows epitaxially onto the surfaces of the nanocrystals. The current invention solves several problems relevant to the art:

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## Document Number 1

Entry 1 of 1

File: USPT

Mar 14, 2000

DOCUMENT-IDENTIFIER: US 6037124 A

TITLE: Carboxylated polyvinylidene fluoride solid supports for the immobilization of biomolecules and methods of use thereof

## DEPR:

A second method of the present invention is outlined in FIG. 2 wherein the various steps of the method are illustrated. Referring to FIG. 2, a carboxylated PVDF solid support (1) is first activated through its pendent carboxyl groups (5). In preferred embodiments, active esters are formed by reacting carboxyl groups with a suitable reagent such as carbodiimides (EDAC, DDC or the like), with or without NHS as a catalyst. Alternatively, the activated support can be converted to acid halides (O.dbd.C--X, where X=I, Br, Cl, F); other active esters (NHS, p-nitrophenyl, and the like); or transformed into acyl azides (O.dbd.C--N.sub.3) from the hydrazide (O.dbd.C--NH--NH.sub.2 R) which is also an active intermediate. The activation provides active sites (6) which promote the attachment of reactive nucleophilic groups found on derivatized oligonucleotides e.g., an oligonucleotide labeled at its 5' or 3' terminus with an amino functionality. (7). Following covalently coupling a derivatized oligonucleotide probe (7) to an activated support (5) to form covalently immobilized oligonucleotide probes, applying a sample containing labeled target oligonucleotides (8) under hybridizing conditions will result in the oligonucleotide probe and the oligonucleotide target forming a complex when they are sufficiently complementary. After thoroughly washing the carboxylated PVDF surface, detecting the presence of the label determines the presence of complementary oligonucleotide target in the sample. The label can be a streptavidin-conjugate label or other reporter system (9). Other labels and reporter groups are described above.

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## Document Number 2

Entry 2 of 7

File: USPT

Nov 23, 1999

DOCUMENT-IDENTIFIER: US 5990479 A

TITLE: Organo Luminescent semiconductor nanocrystal probes for biological applications and process for making and using such probes

## DEPR:

The particular affinity molecule forming a part of the organo-luminescent semiconductor nanocrystal probe of the invention will be selected based on its affinity for the particular detectable substance whose presence or absence, for example, in a biological material, is to be ascertained. Basically, the affinity molecule may comprise any molecule capable of being linked to a luminescent semiconductor nanocrystal compound which is also capable of specific recognition of a particular detectable substance. In general, any affinity molecule useful in the prior art in combination with a dye molecule to provide specific recognition of a detectable substance will find utility in the formation of the organo-luminescent semiconductor nanocrystal probes of the invention. Such affinity molecules include, by way of example only, such classes of substances as monoclonal and polyclonal antibodies, nucleic acids (both monomeric and oligomeric), proteins, polysaccharides, and small molecules such as sugars, peptides, drugs, and ligands. Lists of such affinity molecules are available in the published literature such as, by way of example, the "Handbook of Fluorescent Probes and Research Chemicals", (sixth edition) by R. P. Haugland, available from Molecular Probes, Inc.

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